ALG6-congenital disorder of glycosylation

ALG6-congenital disorder of glycosylation (*ALG6*-CDG, also known as congenital disorder of glycosylation type Ic) is an inherited condition that affects many parts of the body. The signs and symptoms of *ALG6*-CDG vary widely among people with the condition.

Individuals with *ALG6*-CDG typically develop signs and symptoms of the condition during infancy. They may have difficulty gaining weight and growing at the expected rate (failure to thrive). Affected infants often have weak muscle tone (hypotonia) and developmental delay.

People with *ALG6*-CDG may have seizures, problems with coordination and balance (ataxia), or stroke-like episodes that involve an extreme lack of energy (lethargy) and temporary paralysis. They may also develop blood clotting disorders. Some individuals with *ALG6*-CDG have eye abnormalities including eyes that do not look in the same direction (strabismus) and an eye disorder called retinitis pigmentosa, which causes vision loss. Females with *ALG6*-CDG have hypergonadotropic hypogonadism, which affects the production of hormones that direct sexual development. As a result, most females with *ALG6*-CDG do not go through puberty.

Frequency

The prevalence of *ALG6*-CDG is unknown, but it is thought to be the second most common type of congenital disorder of glycosylation. More than 30 cases of *ALG6*-CDG have been described in the scientific literature.

Genetic Changes

ALG6-CDG is caused by mutations in the *ALG6* gene. This gene provides instructions for making an enzyme that is involved in a process called glycosylation. Glycosylation is the process by which sugar molecules (monosaccharides) and complex chains of sugar molecules (oligosaccharides) are added to proteins and fats. Glycosylation modifies proteins and fats so they can perform a wider variety of functions. The enzyme produced from the *ALG6* gene transfers a simple sugar called glucose to the growing oligosaccharide. Once the correct number of sugar molecules are linked together, the oligosaccharide is attached to a protein or fat.

ALG6 gene mutations lead to the production of an abnormal enzyme with reduced or no activity. Without a properly functioning enzyme, glycosylation cannot proceed normally, and oligosaccharides are incomplete. As a result, glycosylation is reduced or absent. The wide variety of signs and symptoms in *ALG6*-CDG are likely due to impaired glycosylation of proteins and fats that are needed for normal function in many

organs and tissues, including the brain, eyes, liver, and hormone-producing (endocrine) system.

Inheritance Pattern

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

Other Names for This Condition

- ALG6-CDG
- carbohydrate-deficient glycoprotein syndrome type Ic
- carbohydrate-deficient glycoprotein syndrome type V
- CDG syndrome type Ic
- CDG1C
- CDGIc
- congenital disorder of glycosylation type Ic
- glucosyltransferase 1 deficiency

Diagnosis & Management

These resources address the diagnosis or management of ALG6-CDG:

- GeneReview: Congenital Disorders of N-Linked Glycosylation and Multiple Pathway Overview
  https://www.ncbi.nlm.nih.gov/books/NBK1332

These resources from MedlinePlus offer information about the diagnosis and management of various health conditions:

- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html
- Palliative Care
  https://medlineplus.gov/palliativecare.html

Additional Information & Resources

MedlinePlus

- Health Topic: Metabolic Disorders
  https://medlineplus.gov/metabolicdisorders.html

Genetic and Rare Diseases Information Center

- ALG6-CDG (CDG-Ic)
  https://rarediseases.info.nih.gov/diseases/9829/alg6-cdg-cdg-ic

Educational Resources

- CLIMB: Congenital Disorders of Glycosylation Info Sheet
  http://www.climb.org.uk/IMD/Charlie/CongenitalDisordersofGlycosylation-General.pdf
- Disease InfoSearch: Congenital Disorder of Glycosylation Type 1C
  http://www.diseaseinfosearch.org/Congenital+Disorder+of+Glycosylation+Type+1C/1808
- EUROGLYCANET
  http://www.euroglycanet.org/uz/CDG
- MalaCards: alg6-congenital disorder of glycosylation
  http://www.malacards.org/card/alg6_congenital_disorder_of_glycosylation
- Orphanet: ALG6-CDG
  http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=79320
- The Centers for Disease Control and Prevention: Facts About Developmental Disabilities
  https://www.cdc.gov/ncbddd/developmentaldisabilities/facts.html

Patient Support and Advocacy Resources

- American Association on Intellectual and Developmental Disabilities (AAIDD)
  http://aaidd.org/
- CLIMB: Children Living with Inherited Metabolic Diseases (UK)
  http://www.climb.org.uk/
- Contact a Family (UK)
  http://www.cafamily.org.uk/medical-information/conditions/c/congenital-disorders-of-glycosylation/
- National Organization for Rare Disorders (NORD): Congenital Disorders of Glycosylation
  https://rarediseases.org/rare-diseases/congenital-disorders-of-glycosylation/

- RareConnect
  https://www.rareconnect.org/en/community/cdg
- The Arc: For People with Intellectual and Developmental Disabilities
  http://www.thearc.org/

GeneReviews

- Congenital Disorders of N-Linked Glycosylation and Multiple Pathway Overview
  https://www.ncbi.nlm.nih.gov/books/NBK1332

Genetic Testing Registry

- Congenital disorder of glycosylation type 1C
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C1864178/

ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22congenital+disorder+of+glycosylation+type+Ic%22+OR+%22Carbohydrate-deficient+glycoprotein+syndrome+type+Ic%22+OR+%22Congenital+Disorders+of+Glycosylation%22

Scientific articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28congenital+disorder+of+glycosylation+type+Ic%5BTIAB%5D%29+OR+%28alg6-cdg%5BTIAB%5D%29+OR+%28cdg-Ic%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D

OMIM

- CONGENITAL DISORDER OF GLYCOSYLATION, TYPE Ic
  http://omim.org/entry/603147

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